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# Study on a Process-oriented Knowledge Management Model

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## Abstract

Now knowledge has become the most important resource of enterprises. Process-oriented knowledge management (POKM) is a new and valuable research field. It may be the most practical method to deal with difficulties in knowledge management. The paper analyzes background, hypothesis and proposes of POKM, define the process knowledge, and give a process-oriented knowledge management model. The model integrates knowledge, process, human, and technology. It can improve the decision support capability and the adaptability of business process.

**Keywords:** Knowledge Management, Process-oriented, Model

## 1 Introduction

Knowledge management appeared in 1970s (Rickson, 1976). Knowledge management refers to the all management to all the knowledge related to activities, operations, plans, strategies (Karl M.Wiig, 2004). Recently, there are two main research directions. One is information management which manage knowledge through information content and tools. The other emphasizes on the human skill, pattern and action(Zhongtuo Wang, 2004). Now there are many researches from the foregoing two perspectives (Nonaka (2000), Karl M Wiig (2003), Robert M.Grant (2003); Michael J. Earl (2002), Zeleny, M. (2002), Zhu, Z. (2002), Jifa Gu, Xijin Tang (2005)).

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We can see that traditional knowledge management mainly focus on partially effective method, which may be useful on specific knowledge activities. But knowledge management and business process have not combined well with each other. It is independent from each other. The management, maintenance and update of knowledge base add burden to employees. The gap between knowledge management and business process cannot satisfy the real management need of the enterprise. So the goal of conveying the proper knowledge to the proper person on proper time can not be realized. As to an enterprise, the most important issue is the transfer and expend of knowledge, especially the best practice experience.

Some researchers improved process-oriented knowledge management model (Kai Mertins, Peter Heisig and Jens Vorbeck, 2003, Schreiber, 2000, Beach, 1999, 2000, Kaiser, 1999, Kaiser, 1999, Allweyer, 1998, Hinkelmann, 2002, Wiig, 1995, Guo and Dang, 2004, Yu and Gan, 2005). Based on these research, the paper analyzes background, hypothesis and proposes of POKM, define the process knowledge, and give a process-oriented knowledge management model. It can improve knowledge of employee and enhance decision support and adaptability of the process.

## 2 Process Knowledge and Process-oriented Knowledge Management

In 2002, Humboldt University and Fraunhofer Competence Center Knowledge Management launched the first global Delphi investigation about knowledge management. The result shows

the integration of knowledge management with business process is the most important field. It also may be the most effective solution to difficulties in knowledge management (Wolfgang Scholl and Peter Heisig, 2002). One in three (29.8%) companies mentioned that it is important, a key factor to successful knowledge management, and strongly suggested to integrating knowledge management with business process.

Fraunhofer investigation shows that most of the manufacture and service enterprises regard knowledge management as a part of their company culture (Kai Mertins, Peter Heisig and Jens Vorbeck, 2003). According to the study of Canfield, 72 percent of the European CEO refer that aim of knowledge management is to integrating process, creation, transfer and application of knowledge to realize the goal of the organization (Canfield, 1998). Fraunhofer believed that one of the reasons for the failure of the ERP in 1990s was the neglect of knowledge (Kai Mertins, Peter Heisig and Jens Vorbeck, 2003). Undoubtedly, knowledge management has entered a new stage of theory and practice. The emphases of knowledge management is combination of human resource, business process, and information technology.

POKM is based on the reasons and hypothesis as follows.

1) We solve problems using knowledge and special technology which come from colleagues,

suppliers, customers, competitors.

2) Short of time is the biggest obstacle in the application of knowledge management (Bullinger etc, 1997). So knowledge management must be integrated with daily work and business process. A new department for knowledge management usually adds cost and can not solve problem.

3) Methods of knowledge creation, storage and transfer of knowledge is different for different business process.

### 3 Process-oriented knowledge management model

Business process includes four factors, input resource, activity, interaction of the activity and output. The main object of process management is process. The combination of knowledge and process is the most important to improve management and operation. Since the strategy is implemented through business process. Customer's requirement is met through business process. Business process determines the quality, efficiency, cycle and cost of the product and service.

It is realized by a series process from Customer's requirement to customer's satisfaction. The process is shown in Figure 1. The knowledge related this process disperses in the drains of the employees, the business activity of the organization, the relationship inside

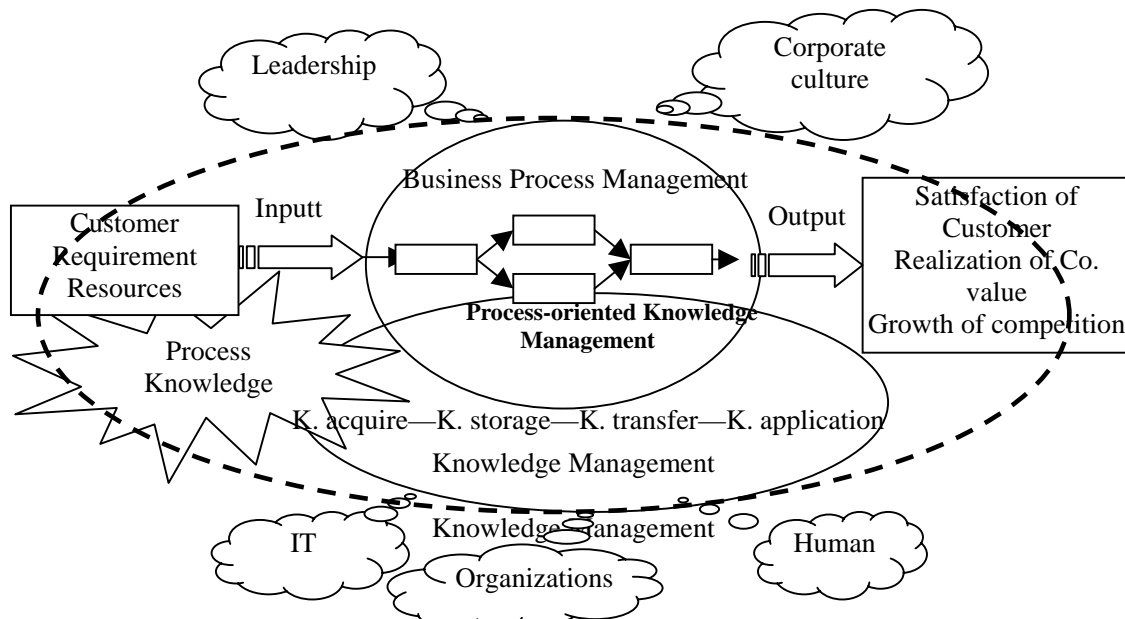


Fig. 1 The model of process-oriented knowledge management

organization, and the existing documents. This is an important part of knowledge asset. This kind of knowledge is process knowledge. Use of the technology and method of process management and knowledge, we can manage this process knowledge i.e. process-oriented knowledge management.

Business process-oriented knowledge management model which is shown in Figure 1. It consists of three phases. The first one is business process management which creates profits and the value; therefore, it is the core and goal to manage business processes for business process-oriented knowledge management. The purpose of it is to improve the efficiency and effectiveness of process management, customer value and corporate competence. The second one is knowledge management, including knowledge acquisition, knowledge storage, knowledge transfer and knowledge application which must be integrated into business process while a separate one means little value. The third one is the field involved in the business process-oriented knowledge management, including the leadership, IT technology, corporate culture, human resources, and organization, which are the critical success factors of business process-oriented knowledge management from the survey (Peter Heisig and Wolfgang Scholl, 2002). The critical success factors of business process-oriented knowledge management are people-oriented, computer integration, organized support, and continuous

process improvement.

The significances of business process-oriented knowledge management are: 1) to provide decision support for leadership; 2) to avoid the loss of knowledge resulting from the resign of employees; 3) to provide relevant information for the development of information systems, and shorten the time system development; 4) to shorten the transition time to mobilize staff positions; 5) to extract and mine business process knowledge, so the process can be achieved in the sharing and the use of knowledge and the management level and efficiency can be improved; 6) to find hidden problem and provide early solution of possible disruptions. However, many corporations are unable to manage this knowledge and are even not aware that they have this knowledge.

The concept of process knowledge can essentially deal with the business processes of corporation management from the perspective of knowledge. So one can use knowledge management approach to manage process, and on the other hand, when the type of knowledge is clear, knowledge management is more focused. In addition, process knowledge is a kind of course knowledge, so people can have a more in-depth exploration of course knowledge through the reach of process knowledge.

Process knowledge is mainly to describe and realize a business objective, define and implement the related business process knowledge. According to characteristic of

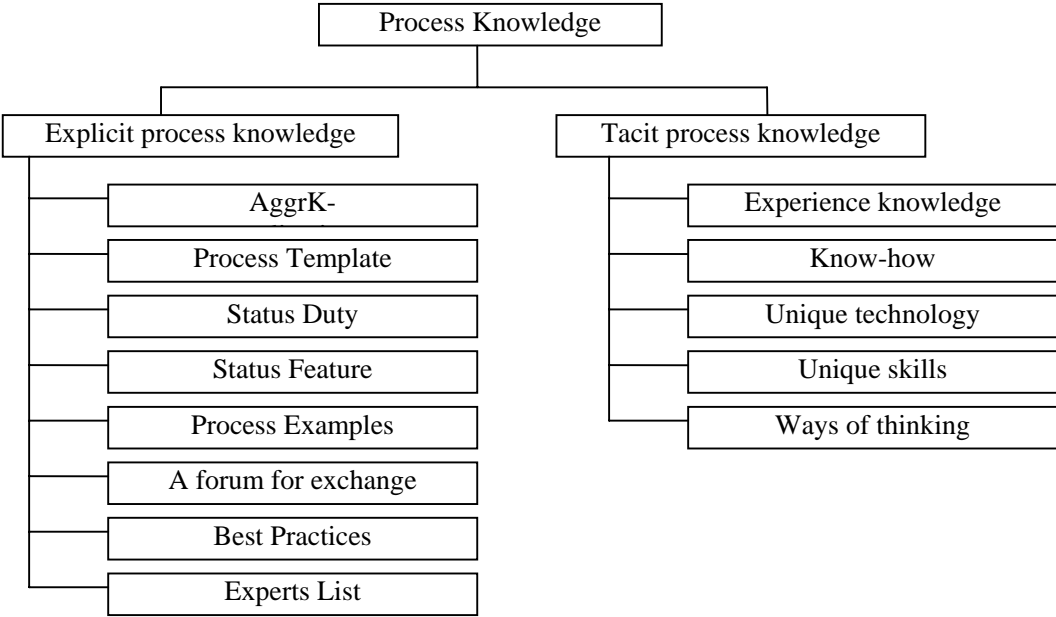


Figure 2 Process knowledge and classification

business process-oriented knowledge management in which "process" and "person" is the key point and the knowledge classification criteria (Polanyi, 1996, Nonaka, 1994), process knowledge can be divided into will flow into explicit process knowledge and tacit process knowledge. Explicit process knowledge refers to the flow of knowledge can be clearly expressed by words, figures, graphic or other symbols, such as process templates, procedure examples, note files and so on. Tacit process knowledge refers to highly personalized, not officially, only be understood unspeakable process knowledge, such as know-how, skills and ways of thinking.

On the basis of the above classification of knowledge, we define the process knowledge as the way which is shown in Figure 2. Knowledge maps can be further linked to the knowledge and expertise to provide rapid retrieval and access.

#### 4 Business process-oriented intelligent knowledge management Meta-Synthesis system model

YuxinYu (2005) put forward the concept of knowledge management meta-synthesis model in which business processes, knowledge, people and information technology constitute the four factors of human-computer cooperated knowledge management meta-synthesis (figure 3). The four factors are complementary and dynamic associated, which are indispensable for the effective implementation of the business process-oriented knowledge management. Business process management emphasized the requirement of a

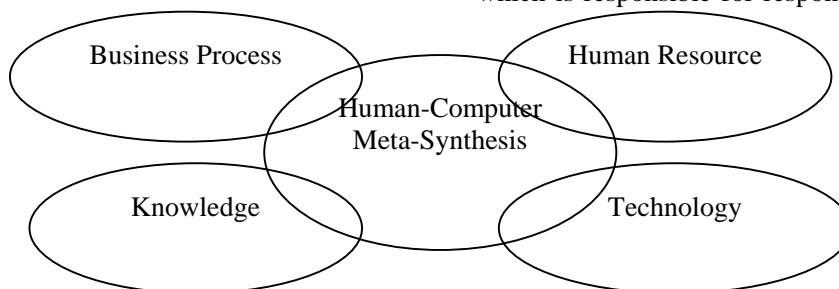


Figure 3 Integrated knowledge management Meta-Synthesis model

modern flat network-oriented organization from the organizational perspective, and the requirement of process management to replace the traditional management. The factor of human requires people-oriented corporate culture, and people play the lead role in knowledge management.

Knowledge is an independent element to be expressed. We must pay a lot of attention to the management of the production, acquisition, accumulation, use and innovation of knowledge resource. Information technology will constitute the technical basis for implementing knowledge management and provide advanced technical support for business process, knowledge and staff operation.

This paper provides a business process-oriented intelligent knowledge management meta-synthesis system model (figure 4) on the basis of previous studies of resorts and conceptual model. It is under the guidance of complex adaptive system theory and meta-synthesis methodology and it also integrated with business process-oriented knowledge management requirement and objective. And it can realize the organic integration of the knowledge, people and process in the entire business process management and course. Meanwhile, under the guidance of agent-based software engineering, with the definition of meta-synthesis model proposed in this paper, people can design and develop business process-oriented knowledge management meta-synthesis system.

The system includes six layers: the interface layer, the presentation layer, the function layer, the correspondence layer, the storage layer and the information layer.

The interface layer: to provide human-computer interaction between systems and customers with the uniform, standard and easy to learn browser integrated operation interface. It shielded the complicated management procedure of the system.

The presentation layer: the layer mainly includes the knowledge gate system of the organization, which is responsible for responding to a customer

operation and showing a processing result. The knowledge gate system is the only entrance for the customer to access to the knowledge management system. The knowledge gate optimizes and integrates the inner part and exterior information that the organization has been already had. This

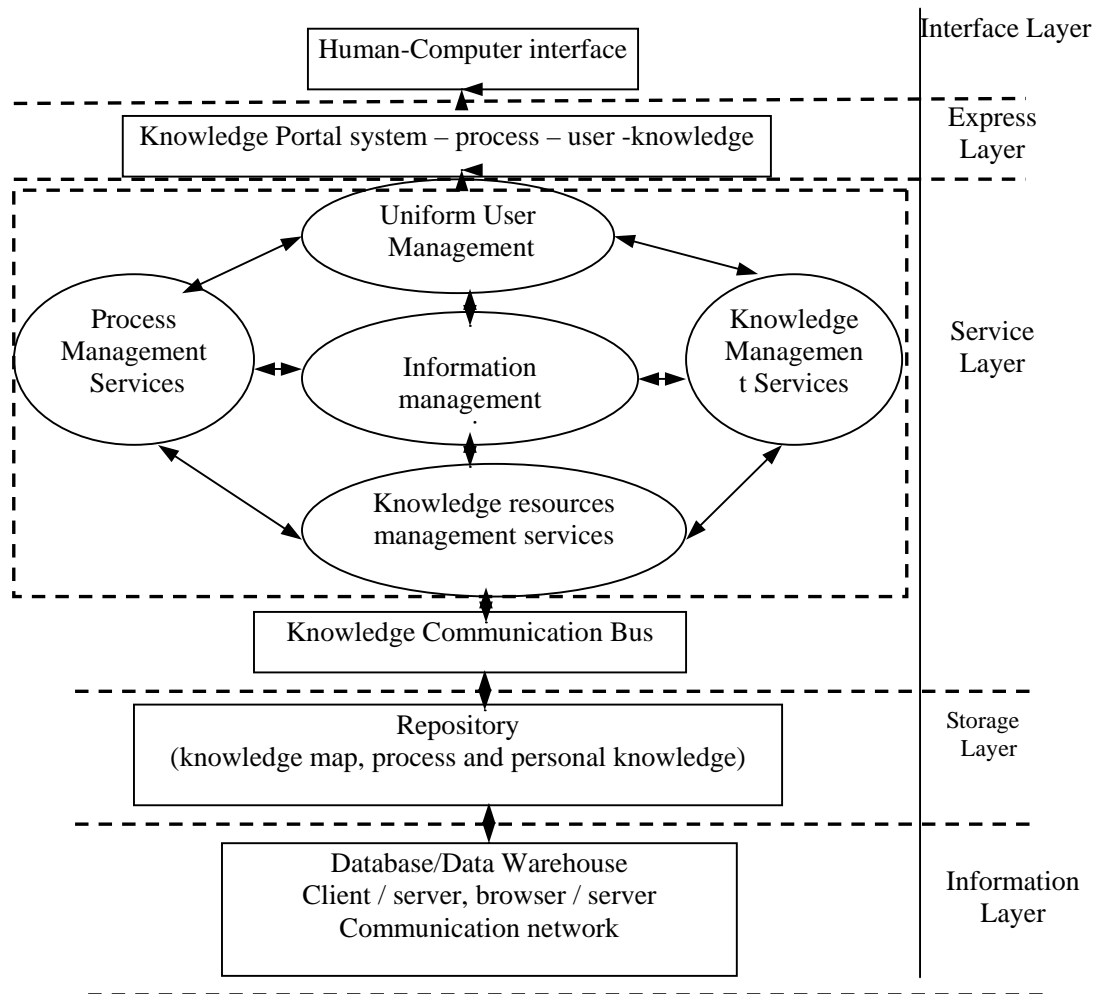


Figure 4 Business process-oriented intelligent knowledge management Meta-Synthesis system model

makes the employee, customer in the organization and cooperation colleague etc be able to visit, sample, analyze and save the personalization knowledge needed by them from the single terrace. The customer can make use of this terrace to acquire knowledge, and make a reasonable business decision to perform.

The service layer: including the uniform user management, process management service, information management service, knowledge management service and the source of knowledge service. It carries out the whole process dynamic state integration service of business process and knowledge management.

The communication layer: It mainly provides knowledge communication service through the infrastructure of the business enterprise network. It is the public communication equipments of the system constituent parts.

The storage layer: it is the base of the synthesize integration system information and knowledge

which centralized manage and maintain the system knowledge, including knowledge map, process knowledge and other knowledge etc.

The information layer: the information layer includes the physical layer and the data layer. The physical layer is the lowest layer of this model frame, which is the infrastructure of knowledge management. It constitutes a delivering knowledge outlet, serving up for several top layers. The physical layer also can be divided into two sub-levels. The first sub-level is communication network layer, which is used to support the dissemination of the information. It is the foundation lowest floor. The second sub-level is client/server or browser/server layer, which is one of the important links of physical structure and physical layer that accesses the information and data. It provides hardware support for the knowledge management together with the communication network layer.

Figure 5 is the whole process knowledge management facing to the knowledge service node of the business process. The knowledge management service module provides the whole process of the business process with knowledge to push to send, search and the double serves toward the exchanges. It carries on the process programming, the process performance, the process finish and evaluations to the business process. The process management service module carries on a management of the business process and combines coordination, follow and track the circulating of

The system model has characteristics as follows:  
 1) The knowledge management activity and the management and movement of business process get close integration through the knowledge service node of man-machine combination.

2) The knowledge service has good intelligence and the adaptability, and it can organize the knowledge resources dynamic according to the instant knowledge service need of the business process. It provides knowledge support with pushing to send, searching and the double serves toward the exchanges. It can also get intelligent

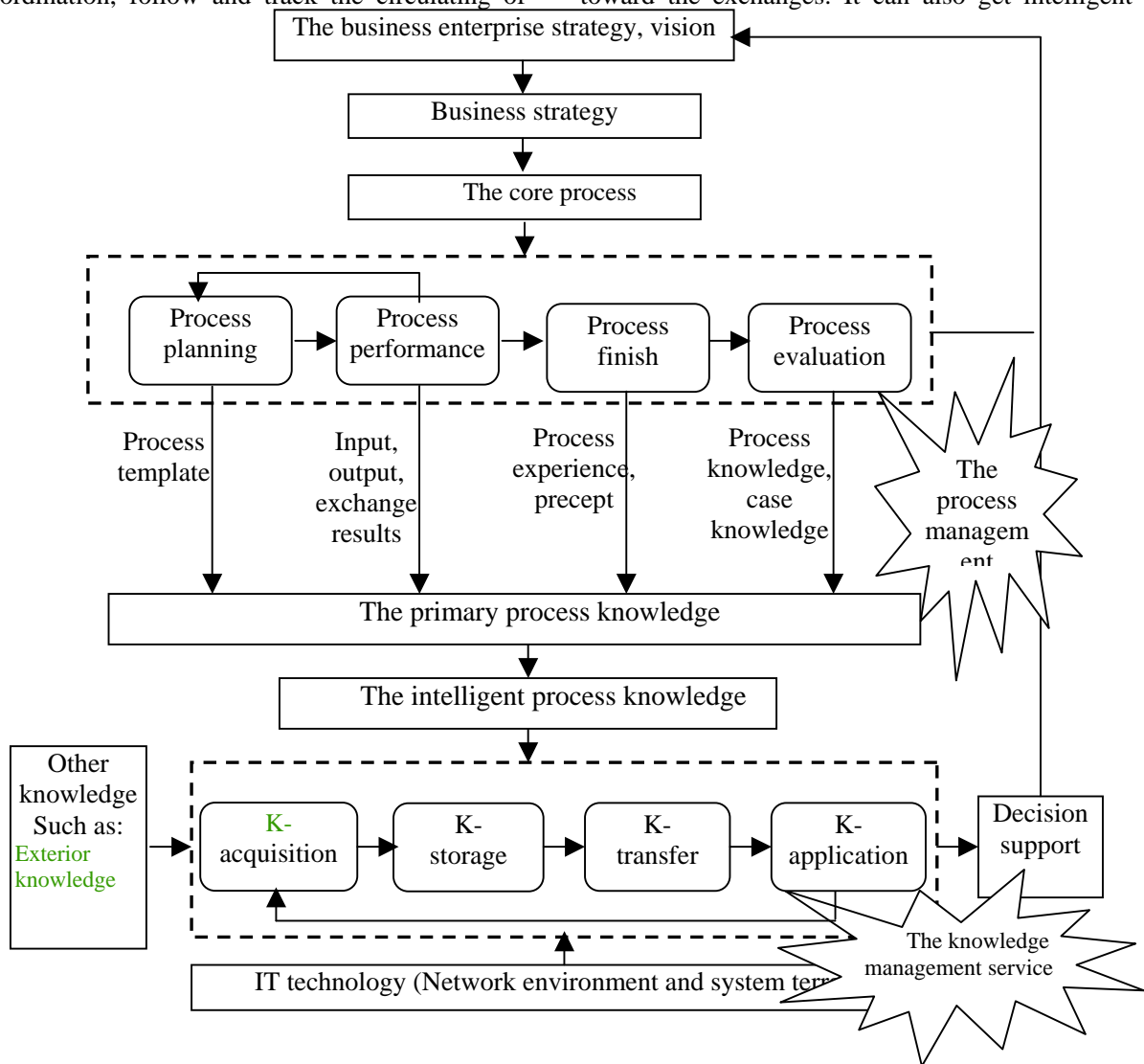


Figure 5 The process of process oriented knowledge management

business process. The knowledge source management service module carries on unifying interview and support to the knowledge base. It provides way to access the intelligent knowledge resources service for the knowledge management service module and the process management service module.

knowledge form primary knowledge.

3) It can raise the team member's knowledge level, experience level and work technical ability through the knowledge exchanges, sharing and application in the process of the business process management and performance. It carries out a continuous improvement of the business process

through keeping on raising the quality of the completion process activity and mission. It carries out process innovation and knowledge innovation through the establishment of new process with knowledge, experience and technical ability.

## 5 Case Study: In a Bank Loan Decision Process

### 1) Loan decision process and knowledge resource

Figure 6 is a general bank loan process. In fact, the process is a decision process based on knowledge analysis, judge and assessment. Quality and efficiency of loan decision lies on the capacity of the organization to use technology and knowledge. On loan decision, A bank has

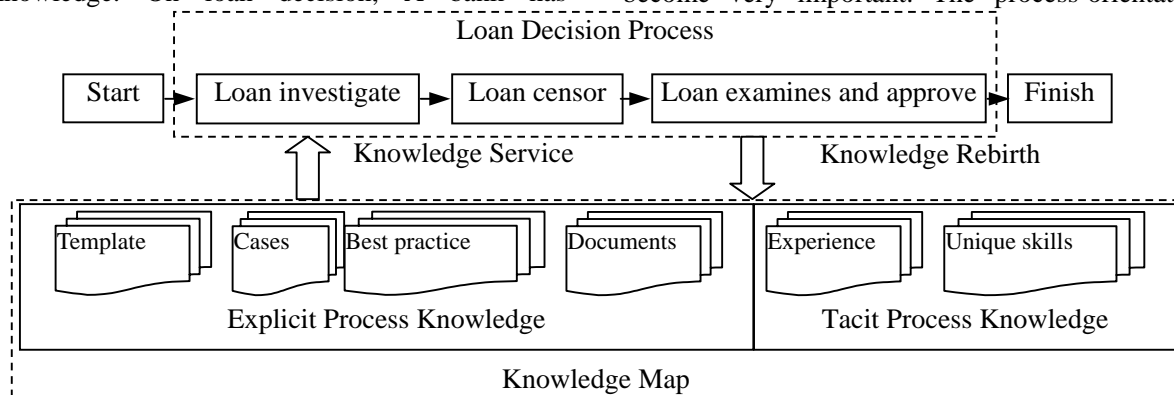


Figure 6 Loan decision process and knowledge resource

accumulate some experience, but they are dispersed in employees. By building the business process-oriented intelligent knowledge management Meta-Synthesis system, they hope can summarize, conclude, classify, systematic to explicit and tacit process and use it in loan decision process to improve the process efficiency and Quality. On the other hand, they hope they can increase their knowledge capital by it.

The knowledge resource in the loan decision process includes process knowledge and personal knowledge. As figure 6, we can divide it into explicit process and tacit process knowledge. In order to use and manage such knowledge adequately, we use knowledge map to improve contract in knowledge resource. Such as, it can improve knowledge service, quick search and invitation.

### 2) A loan decision Process-oriented knowledge management system model

As figure 7, the model is based on intrinsic technology platform of A bank. Such as UNIFACE is come from Computer ware Company(Yu,2005).

### 3) Improve to loan decision process

In order to validate, the paper selected 32 projects in the loan decision of A bank. The evaluating result is as follows (Yu,2005):

Elements	Last year	This year
Load Quality grade (A)	5%	6.8 %
Censor eligibility rate	82%	93.75%
Process average	40days	25days

## 6 Conclusion and Future Work

Now, knowledge has become the first important resources of a business enterprise. As a result, how the business enterprise to obtain knowledge and how to make use of the shared knowledge has become very important. The process-orientated

knowledge management is a completely new research realm with practical value; it maybe the most practical method to resolve the practical problem of knowledge management effectiveness. The paper analyzes the background and the assumption of putting forward the process-oriented knowledge management, puts forward the model of the process orientation knowledge management, defines the process knowledge and puts forward the intelligence knowledge management synthesize integration system model of the process orientation. And a case study about a loan decision process knowledge management is given to approve it.

Future work will be on how to improve the system model and how to incentive employees to contribute more to the system.

## Acknowledgment.

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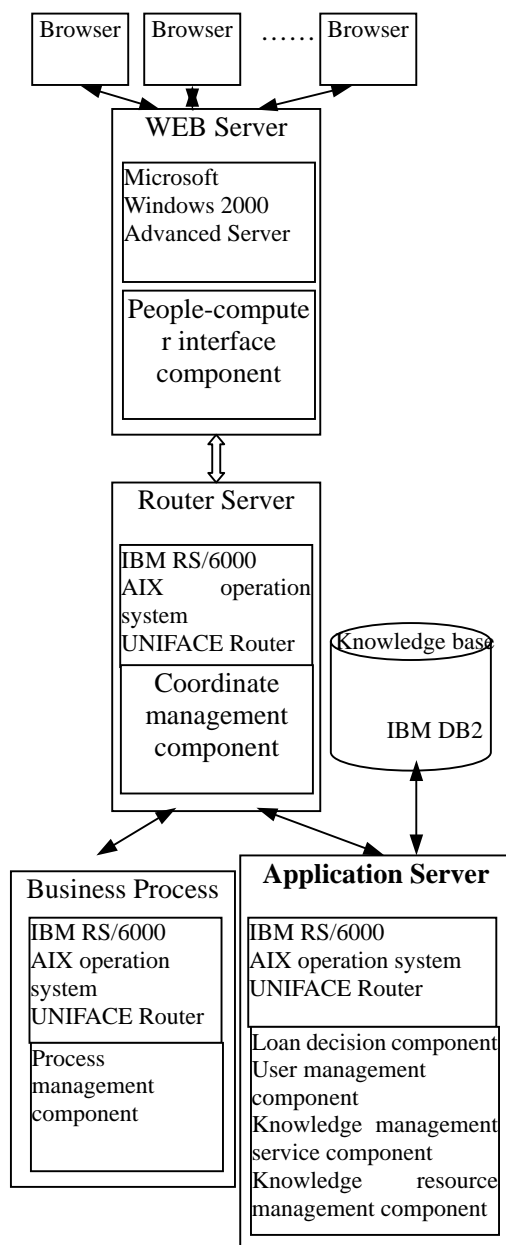


Figure 7 A loan decision Process-oriented knowledge management system model

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